



5. The method of claim 1, wherein the step of acquiring a high speed image of an area of the substrate includes the steps of:

delivering a pulse light from a broad band light source onto the substrate;  
and  
utilizing a conventional camera.

6. The method of claim 5, wherein the said broad band light source comprises a flash lamp.

7. The method of claim 1, wherein the step of converting the corresponding acquired high speed image into a thickness measurement includes the step of converting pixels of the acquired high speed image into layer thickness.

8. The method of claim 1, wherein said determination of layer thickness of the substrate is performed in situ.

9. An apparatus for determining layer thickness of a substrate during CMP of the substrate comprising:  
a high speed imager adapted to acquire images of areas of the substrate in situ;

a processing unit in electronic communication with said high speed imager;

memory in electronic communication with said processing unit and containing a plurality of instructions which, when executed by said processing unit, causes said processing unit to:

compare images acquired by said high speed imager to image patterns stored in said memory device; and

convert an acquired image into a layer thickness measurement when said acquired image corresponds to a predetermined one of said image patterns stored in said memory device.

10. The apparatus of claim 9, wherein said high speed imager comprises:

a pulsed, coherent light source; and

a conventional camera.

11. The apparatus of claim 10, wherein said coherent light source comprises a laser.

12. The apparatus of claim 9, wherein said high speed imager comprises:

a conventional light source; and

a high speed camera.

13. The apparatus of claim 9, wherein said high speed imager comprises:  
a pulsed, broad band light source; and  
a conventional camera.

14. The apparatus of claim 13, wherein said broad band light source  
comprises a flash lamp.

15. A method of determining end-point during CMP of a substrate  
comprising the steps of:  
acquiring images of the substrate using a high speed imager;  
comparing the acquired images to stored image patterns;  
converting an acquired image into a layer thickness measurement when  
the acquired image corresponds to a predetermined stored image pattern; and  
stopping CMP when the layer thickness measurement is a predetermined  
value indicating end-point.

16. The method of claim 15, wherein the step of acquiring images of the  
substrate includes the steps of:  
projecting a conventional light source onto the substrate; and  
utilizing a high speed camera.

17. The method of claim 15, wherein the step of acquiring images of the  
substrate includes the steps of:

delivering a pulse of light from a coherent light source onto the substrate;  
and  
utilizing a conventional camera system.

18. The method of claim 17, wherein said coherent light source comprises a laser.

19. The method of claim 15, wherein the step of acquiring images of the substrate includes the steps of:

delivering a pulse of light from a broad band light source onto the substrate; and

utilizing a conventional camera.

20. The method of claim 19, wherein said broad band light source comprises a flash lamp.

21. The method of claim 15, wherein the step of converting a corresponding acquired image into a thickness measurement includes the step of converting pixels of the corresponding acquired image into layer thickness.

22. The method of claim 15, wherein said determination of end-point during CMP of a substrate is performed in situ.

23. An apparatus for determining end-point during CMP of a substrate comprising:

a high speed imager configured to acquire images of the substrate in situ;

a processing unit in electronic communication with said high speed imager;

a memory device in electronic communication with said processing unit and containing a plurality of instructions which, when executed by said processing unit, causes said processing unit to:

compare images of the substrate acquired by said high speed imager to image patterns stored in said memory device;

convert an acquired image into a layer thickness measurement when said acquired image corresponds to a selected image pattern stored in said memory device; and

stopping CMP when the layer thickness measurement equals a predetermined value indicating end-point.

24. The apparatus of claim 23, wherein said high speed imager comprises:

a pulsed, coherent light source; and

a conventional camera.

25. The apparatus of claim 24, wherein said coherent light source comprises a laser.

26. The apparatus of claim 23, wherein said high speed imager comprises:

a conventional light source; and  
a high speed camera.

27. The apparatus of claim 23, wherein said high speed imager comprises:

a pulsed, broad band light source; and  
a conventional camera.

28. The apparatus of claim 27, wherein said broad band light comprises a flash lamp.